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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 19, 1942

Medicine, 1942

See Page 189

A SCIENCE SERVICE PUBLICATION

Do You Know?

One-fourth of all *maple syrup* is used in tobacco manufacture.

Cut flowers, and particularly carnations, will wilt in the presence of apples because the fruit gives off ethylene gas.

Alaska's human population of 72,524 is scattered throughout the territory with a density of about one person to every eight square miles.

Early records of *cotton* cultivation, found in the ruins of an ancient city of India, show that the textile was grown and spun as early as 3,000 B.C.

Accuracy of *"electric eyes,"* the photoelectric cells used in counting traffic, is seriously impaired during extremely hot or cold weather, unless the machines are insulated.

Mobile *service plants,* ranging from station wagons to ten-ton trucks, follow advancing units of America's airplanes on battle duty, ready to diagnose and repair airplane damage.

The extreme scarcity of *iodine* in Germany has resulted in numerous substitutes for this antiseptic, some of which are bromine compounds; the germicidal value of these substances has not been convincingly shown.

In the eighteenth century *scientists* began writing simply, for the lay public; Latin was abandoned by many scientific writers; and many children's books on physics, motion, water, fire, vision, and the like, ran into several editions.

Question Box

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Most articles which appear in* SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

Sphagnum moss has been used with excellent results as a surgical dressing material, being better than absorbent cotton for some types of dressing.

Bark patterns of some *fossil trees* show diamond-shaped scars left by fallen leaves; these scars continued to grow during the life of the tree, even though the leaves themselves had fallen.

A flock of 24 *hens* will produce a constant supply of fresh eggs and an occasional chicken dinner for a family of five.

"Blackout rooms," those to which the family will retire in case of air raids, should have emergency lighting, heat, water, food, medical supplies, recreational equipment, and fire-fighting apparatus.

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CHEMISTRY

Fats Can Be Tailored

Chemists can duplicate any of the oils affected by war shortages by using any of the common fats we happen to have. Commercial production stage reached.

➤ WAR-CAUSED SHORTAGE in such oils as coconut, palm, China-wood and perilla need not worry us much in the future, as soon as general use begins to be made of a method for "tailoring" any kind of oil we want out of any kind of domestically-produced vegetable oil or animal fat we happen to have. The method was described before the meeting of the American Chemical Society in Buffalo, N. Y., by Dr. Stephen E. Freeman, paint chemist of the Pittsburgh Plate Glass Company's Laboratory in Milwaukee.

The new method, Dr. Freeman announced, has already passed through the critical pilot-plant stage into the beginnings of commercial production.

It depends on the fact that any given natural oil is really a mixture of several different oils. All commonly used food and industrial oils have been thoroughly analyzed, so that we know pretty well what they are made of. It is possible to separate these oils into their respective fractions by using solvents that will take out certain fractions and leave others. Then the fractions can be recombined in any way desired.

Thus, it has been possible to split common linseed oil into two fractions, one of which resembles China-wood oil while the other is like soybean oil. Soybean oil in turn can be split into fractions resembling linseed and cottonseed oils, and so on, with all the natural oils and fats.

Science News Letter, September 19, 1942

Keeps Fats From Spoiling

➤ OTHER CHEMISTS have been at work on the problem of keeping oily and fatty foods from spoiling. The problem is basically one of keeping oxygen away from the fats, because they become rancid by oxidizing. A good anti-oxidant has been found by Dr. H. S. Mitchell and Dr. H. C. Black of Swift and Company's research laboratories, in a well-known product of tropical American trees, gum guaiac. Two years of large-scale testing have shown it to be highly successful in the preservation of lard and on wrappings for other oily foods. It was suggested as a possible solution for the still unlicked problem of preserving dehydrated pork products.

Science News Letter, September 19, 1942

New Packages Save Tin

➤ GLASS CONTAINERS for foods and other commodities formerly packed in tins were cited as a war-time solution of two scarcities problems by Dr. A. H. Warth of the Crown Cork and Seal Company. From the same quantity of tin-coated steel that goes to make only 265 quart cans, 14,400 closures for quart glass containers can be made, he pointed out.

Thirty-pound cans of eggs, used by bakeries and restaurants, are being replaced by equal-sized packages of frozen eggs enclosed first in cellophane, then in cardboard. Each such package releases a whole pound of tinned steel sheet.

The only place where glass cannot compete with tin is in packing goods for Army and Navy use. Glass is too breakable for the rough handling that stores often get at sea or in the field. But civilians at home can do their share by accepting glass-packaged commodities, so that the canned goods may go up to the fighting fronts.

Science News Letter, September 19, 1942

CHEMISTRY

Oil Breakdown Cause Found

➤ DISCOVERED: what makes lubricating oil break down in auto engines. It is the tiny black powdery particles that flow in all long used oil. The deterioration of lubricating oil, shortening both the life of the oil and the life of the motors, was explained by R. G. Larsen and F. A. Armfield of the Shell Development Company, Emeryville, Calif., to the American Chemical Society.

Several things have been blamed for oil breakdown, they stated, including the heated metal of the engine, unburned gasoline, oxidation products of the oil itself, etc. The two researchers found the real culprits to be the tiny black powdery particles that float in all long-used oil. These act as catalysts, aiding the oil to contract an undesirable union with oxygen and then deteriorate. The black particles themselves are of

CARGO CARRIERS AND FIGHTER PLANES, turned out in increasing numbers at Curtiss-Wright, has won the company the joint Army-Navy "E" award for efficient production. Curtiss Commando military transports are shown in the background, while Kittyhawk and Warhawk fighters are seen being assembled in the foreground.

diverse origin: microscopic bits of metal worn off the engine parts, dust from the air, and especially the chlorides of iron and bromine, which arise from the use of leaded gasoline.

Practical moral of the story is the importance of having a good oil filter and seeing that it is always in good working order.

Bad though these black particles are, they mustn't be permitted to accumulate on piston or cylinder walls, another Shell Development Company research showed. This work, carried on by Mr. Larsen with S. K. Talley, showed the relative values of various kinds of chemicals added to lubricants in keeping engine parts clean.

Food for men as well as machines came in for due attention on the part of the chemists.

Science News Letter, September 19, 1942

PHARMACY

Totaquine Ready for Use

Precious cinchona trees, from which quinine has been obtained, now are also source of additional drug now listed officially as weapon against malaria.

➤ "JESUIT'S BARK" from precious cinchona trees, long a source of quinine, will now supply us with another drug for the treatment of deadly malarial fever.

A yellowish-brown potent powder, totaquine, is in the new official book of drugs, the U. S. Pharmacopoeia XII, which will be adopted in November. But because of the urgent need for antimalarials, standards have already been published in a supplement.

Formerly the delicate white crystals of quinine were extracted from the bark and the rest was usually thrown away. Now with our major supply of quinine in the hands of the Japs, other active medicinal substances in the bark will also be extracted, and the mixture used for the same purposes as quinine.

Under present governmental restrictions, it can be used—like quinine—only for treatment of malaria. Totaquine is intended for use by the public, it has been reported, which will free additional supplies of quinine for our men fighting in the malaria-infested regions of the world—Africa, parts of the Mediterranean area, Australia, Java, India, South America, and other tropical climes. Malaria, a periodic disabling fever transmitted by certain mosquitoes, is also prevalent in southern United States and will require much of the new totaquine to keep it under control.

Eight hundred millions of people on our globe are plagued by the fever, authorities estimate, even in peace time. During war many more persons are exposed to the disease-causing, microscopic parasites which hitch-hike from one person's blood to another via the mosquito.

When less than 1/15 ounce of totaquine, the antimalarial mixture, is administered each day for a few days, the symptoms usually clear up and the disease-causing organisms seem to disappear from the blood. But studies have shown that some forms of the organism can fight off the action of totaquine and lurk in the victim's body to flare up when resistance becomes low.

This state of affairs cannot be held against totaquine, however, as quinine itself also misses some of the malarial parasites. In general, scientists believe that totaquine will probably be just as effective as quinine. Nor are any additional undesirable side-actions expected.

Like quinine, most persons can take quite a large dose without harmful effects. Ringing in the ears is the warning alarm that a dangerous over-dosage is near. This is accompanied by impaired vision and headache.

Although the ingredients of totaquine have been known for many years, they have not been widely used. Results of their increased use in the Philippines and India have been reported as satisfactory.

The principal disadvantage encountered in India and the British Empire, as reported in an official memorandum on tropical diseases from the British War Office, is due to wide variation in the strength of the anti-malaria mixture.

But a standardized preparation has been recommended by the Malarial Commission of the League of Nations which overcomes this difficulty. The preparation which will be official in the United States must contain at least 70% of active ingredients from the cinchona bark, called cinchonidine, cinchonine, quinidine, and including at least 10% of the old standby, quinine. There are also many other requirements which insure that a standard, high-quality preparation will be marketed.

A plan is now under consideration to lower the requirement of quinine content, since the quinine content of the South American cinchona bark is lower than that in the Eastern barks which were commonly in use when the standards for totaquine were first considered. Investigations are going forward to increase our knowledge of the drug, as medical men are not yet in complete agreement as to how it compares with the action of other antimalarials.

A recent OPA conference held in Washington indicates that totaquine will sell for less than quinine. This will be important to many persons who have neglected treatment in the past because of the expense.

As our stockpile of quinine continues to dwindle and physicians become more familiar with the use of totaquine, it may well be that the armed forces will also use the preparation to supplement their use of other antimalarials.

In badly infested areas, troops may also be given totaquine, or quinine alone, each day to prevent the soldiers from contracting malaria. This is only effective as long as administration is continued, however. The British War Office believes this is not worthwhile except in those areas in which the disablement of large numbers of troops would be likely. Otherwise, the cases are treated as they arise.

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NUTRITION

Leaves Tested for Use As Part of Human Diet

➤ VALUE OF green leaves as a source of proteins and vitamins for humans and other non-ruminants, has been investigated by the British Society of Chemical Industry. Experimental results show that there are variations in the amounts of the principal vitamins in grass, depending on climate, soil, variety of grass, and other factors.

Not even an enthusiast could get all his vitamin requirements from grass. Between two and four pounds of whole grass must be eaten daily to supply the necessary amount of vitamin B, for example. But it is believed that if the grass were processed for extraction of protein, certain vitamins might be recovered as a by-product.

Science News Letter, September 19, 1942

MEDICINE

Test Pilots for "Blackout"

Sudden changes of position on the "tilt table" combined with electrocardiograph test of heart show what will happen to candidate in leveling off after dive.

➤ MEN WITH high blood pressure that has not been present long can stand dive-bombing better than those with a normal or low pulse pressure, Major Walter M. Bartlett, chief of the cardiovascular section at Lawson General Hospital, Atlanta, Ga., declared at the meeting of the Aero Medical Association in Indianapolis.

They are less likely to "blackout" or faint from sudden change of position because they have a stabilized high pulse pressure, he explained. "Blacking out" or fainting during dive-bombing can be predicted by the use of the Tilt-table Test in conjunction with electrocardiographic tests of the heart and frequent tests of the pulse rate and blood pressure.

This test "should be used routinely in the selection of flying personnel, whether they are to be trained as pilot, navigator or bombardier," Major Bartlett declared.

The Tilt-table Test induces a temporary pooling of the blood in the abdomen and legs similar to that which takes place when a dive-bomber suddenly levels off after a swift descent toward the earth, producing a centrifugal force amounting to several times the force of gravity. This pooling of the blood is what causes the "blacking out" because it depletes the blood supply to the brain. It also depletes the blood supply to the heart muscle and thus temporarily at least reduces the efficiency with which the heart pumps blood through the body.

In a person with heart and blood circulation already impaired, even so slightly that ordinary tests do not show the impairment, the further temporary impairment caused by pooling of blood after power dives may have disastrous results. For this reason the test is useful for selecting flying personnel. It also is of value in detecting heart disease such as angina pectoris before other tests show it.

Effort syndrome or neurocirculatory asthenia can be distinguished by this test, which gives objective evidence of the efficiency of blood circulation, from conditions with similar symptoms which are due to mental or personality illness.

The suitability of convalescent soldiers and officers for flying, combat or limited military service can also be determined by this test.

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Altitude Tolerance

➤ DETECTING a prospective pilot's ceiling can best be done by observing his emotional reactions in a low pressure chamber, Dr. Alvan L. Barach, of New York City, stated.

In a study of 16 normal men, who spent one and three-quarters hours two to four times a week for six to eight weeks in a decompression chamber with atmospheric pressure equivalent to an altitude of 15,000 feet, eight were found to have impairment of emotional control from the moderate oxygen lack.

The changes of behavior which indicated these eight could not stand a ceiling of 15,000 feet consisted in either depressed, sleepy states or unduly excited, euphoric, irritable or pugnacious moods.

In two, Dr. Barach reported "the disturbance in emotional control was sufficiently marked as to raise serious doubt regarding their fitness for flying."

Tests of blood pressure, vital capacity, blind spot area, peg placing and other physiologic and psychometric tests were made but found less reliable than the emotional reaction to oxygen lack as an indication of the candidate's potential flying ability.

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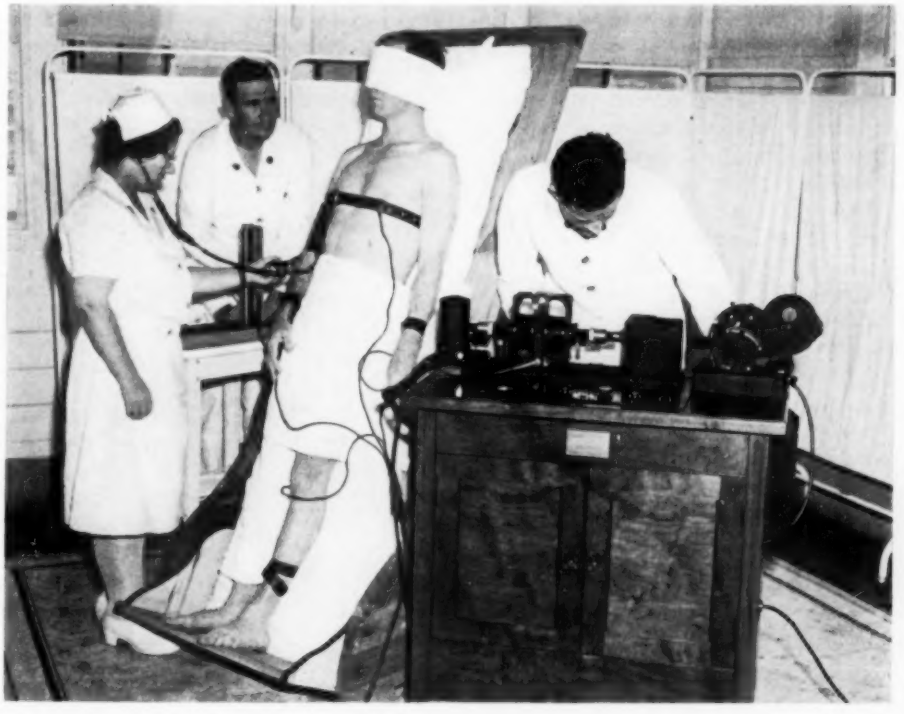
Reducing Pilots' Errors

➤ REDUCTION in the number of aviation accidents and better selection of pilots may come within a "surprisingly short time" by a method proposed to the Aero Medical Association by Dr. A. J. Herbolsheimer, chief of the physical standards section, Civil Aeronautics Authority. (*Turn to next page*)



***THE TILT-TABLE TEST** shown in this official Army Signal Corps photograph, is used for detecting the ease with which a pilot "blacks out" in dive-bombing or vigorous aerobatic performances used in combat flying. An electrocardiogram is being taken together with the blood pressure and pulse, which aids in the diagnosis of heart disease and circulatory inefficiency.*

His method calls for as careful study of the pilots surviving aviation accidents as is now made of the wrecked planes. The study should be made by experts and as soon as possible after the accident, "while everyone is psychologically prepared to advance any information immediately connected with the accident or relating to the pilot's history."

Pilot error was assigned as a cause by the Safety Bureau of the Civil Aeronautics Board in just over 85% of accidents sustained by pilots with no physical defects as compared with just over 86% in the case of pilots with listed defects, Dr. Herbolsheimer said in reporting a special study of a small group of accidents occurring last year.

Accident proneness, found an important cause of industrial accidents, may be a large factor in aviation accidents now attributed to pilot error, Dr. Herbolsheimer believes. The accident proneness may result from physical defects, some of which may be undetected, or from personality defect. Just how many aviation accidents are due to accident proneness is not now known. But the enormous strides made in reduction of industrial accidents by attention to accident proneness of workers strongly suggests that equally good results in reducing aviation accidents may be possible by the same method.

Science News Letter, September 19, 1942

CHEMISTRY

Package Gives Protection

Most conventional of food containers, tin cans and glass jars, afford best insurance against spoilage by poison gas. Cellophane and tinfoil are good.

➤ IF NAZIS or Nips resort to polecat warfare and spray poison gases on the commissary stores, that doesn't necessarily mean that the troops will have to go hungry. Of course, mustard gas instead of mustard on your meat would make it unfit to eat—but if it is wrapped or packaged as well as most commodities are nowadays it will still be good to eat after the covering has been decontaminated and removed.

Do's and don'ts of anti-gas protection for foods were reviewed by Dr. Sidney H. Katz of the U. S. Chemical Warfare Service's main arsenal at Edgewood, Md., speaking before the American Chemical Society in Buffalo.

The most dangerous of so-called poison gases, from the food-contamination viewpoint, are not really gases at all but finely atomized liquid sprays, Dr. Katz explained. These cling to anything they touch, and unless decontaminated will remain dangerous for days. Decontamination is not a job for just anyone; it must be carried on under the direction of an officer trained for this particular job.

Best protection against chemical contamination, the speaker stated, is afforded by the most conventional of food packagings—tin cans and glass jars. Cellophane is very good for excluding the insidious poisons, especially when the package seams are well sealed. Tinfoil and aluminum foil wrappings also are effective, but only if tightly applied.

Simple paper or cloth bags are bad, but several layers of either paper or cloth give fair protection. Corrugated cardboard is good, especially if it has been given a glazed coating. Natural rubber is not as effective against war chemicals as some of the synthetic rubbers.

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FORESTRY

Have You a Cork Oak Tree In Your Neighborhood?

➤ IF THERE is a cork oak in your neighborhood, tell your state forester about it, or write to the Soil Conservation Service, Washington, D. C.

Cork has become one of our severe wartime lacks. The only places where cork oaks grow in real numbers are the uplands of Spain, Portugal and North Africa. And of course we can't get much from there, just now.

To avoid such an ill state of affairs in the future, the U. S. Department of Agriculture is trying to get stands of cork oaks, from whose bark cork is made, established in this country. But first, they have to learn where the trees will grow well. California is a known possibility, but there should be other places, too. That is why the scientists are asking any one who knows of a really authentic cork oak, or a source of cork-oak acorns, to write in about it.

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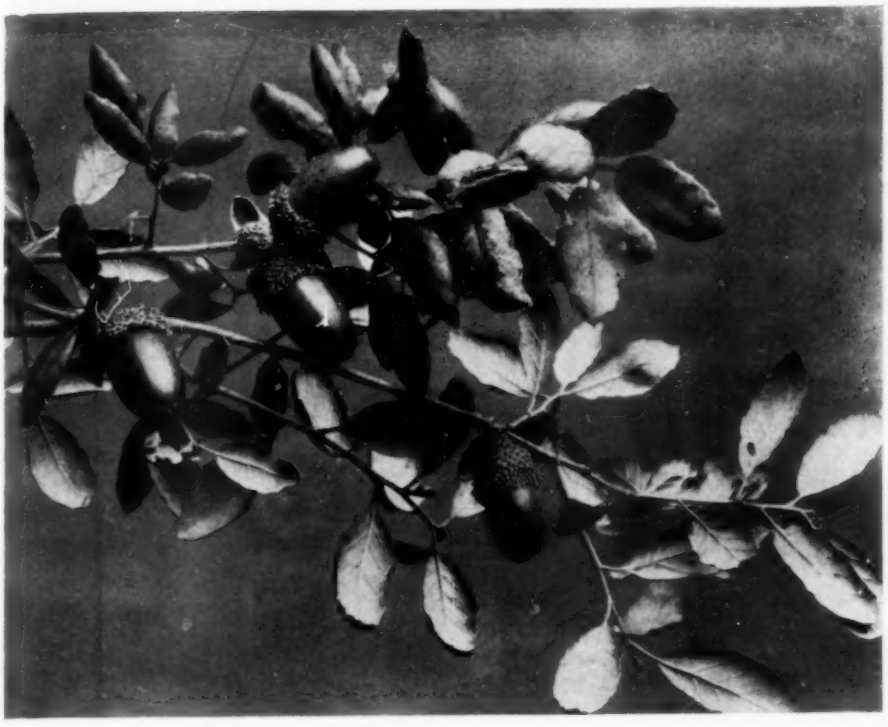
The high proportion of fat in *pork* keeps the lean meat from hardening during the curing process.

Scientists who are experimentally cultivating *jaboticaba* trees in central Florida hope that the grapelike fruits of the new Brazilian import will prove a profitable Southern crop.

WANTED FOR SERVICE—Keep your eyes open for this sort of tree. It is a cork oak tree, from the bark of which cork is made. If you find one growing in your neighborhood write to the Soil Conservation Service about it.



IDENTIFICATION FEATURES—This photograph from the U. S. Department of Agriculture will help you to identify the cork oak needed for war service.

PHARMACY

Remedy From Mushrooms

High blood pressure can be reduced by a compound found in the same table delicacy you eat on beefsteak. Not ready for use yet, however.

➤ HIGH BLOOD pressure can be reduced by a compound found in common mushrooms, the same kind you eat on beefsteak. However, you can't reduce blood pressure by eating mushrooms; the substance works only when injected into the blood stream. Moreover, it isn't ready for general use in human medicine, although preliminary clinical results are pronounced "quite encouraging." Further experimentation is still called for.

This new possibility of medicine from mushrooms was described before the American Chemical Society in Buffalo by two pharmaceutical chemists, Dr. H. Jensen and Dr. Leon E. Tenenbaum of the Upjohn Company.

The compound that actually does the work is an enzyme known as tyrosinase. Its existence has been known for some years, but its pressure-reducing properties are something new to medical science. It was thoroughly tried out on dogs and rats with high blood pressure before even preliminary treatment of human cases was undertaken.

Drs. Jensen and Tenenbaum were led to their research by a rather widely held theory that holds high blood pressure to be due to the release by disordered kidneys of compounds containing the phenolic grouping of atoms—most familiar to the general public in carbolic acid. The phenol group has the effect of contracting the arteries, and hence of raising blood pressure.

Since it was known that mushrooms contain enzymes which will oxidize phenolic compounds, the researchers explained, it was thought that administration of mushroom extracts would be of benefit in combating high blood pressure. They developed new methods for getting these extracts in a high state of purity, and proceeded to "try them on the dog."

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ORDNANCE

Evolution of Rifle Shown By Smithsonian Exhibit

➤ EVOLUTION of the rifle, still the number one weapon of fighting men, is shown in vivid detail by the great collection of pioneer firearms at the Smithsonian Institution in Washington. Although the earliest beginnings of the rifle are German and Swiss, development to its present high state of accuracy and efficiency is principally an American story.

The idea of grooving the bore to insure greater accuracy of fire goes back almost to the beginning of hand firearms, but rifling was never generally used in Europe until it was brought to a high stage of development here. German and Swiss gunsmiths who came into the Colonies in the early eighteenth century brought the primitive European methods of rifling with them. However, their weapons were short-barreled and clumsy, with bores of three-quarters of an inch or more. The leaden bullets had to be hammered down the barrels with a heavy iron ramrod and mallet, which meant a very slow rate of fire.

Pioneers going into the backwoods beyond the Alleghenies, where they had to depend largely on game for their food, needed a totally different type of weapon. The rifle, as it was evolved to meet their requirements, was of much smaller bore, usually less than half an inch. This made for lightness in both weapon and ammunition. Smaller caliber, coupled with the American rifle's great barrel length of 40 to 44 inches, brought about more efficient use of the smaller powder charge, and greatly increased accuracy. Careful design and adjustment of sights was another special feature of early American rifles.

A really revolutionary innovation was the method of loading. Instead of using tight-fitting bullets forced into the grooves, the American long rifles took bullets just slightly smaller than their bore, wrapped in bits of greased cloth or thin leather. A really good frontier rifleman could load his long weapon while actually on the run. It is not too much to say that this patch-loading of the pioneer American rifle was the forerunner of the high-speed semi-automatic fire of today's Garand.

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One American *aircraft* organization has increased its personnel from 80 to more than 40,000, since 1936.

PHYSIOLOGY

Russians Report Changes In Kidneys of Aviators

➤ FLYING at altitudes around 15,000 feet causes characteristic changes in kidney function as a result of the lack of oxygen, experiments at the Central Institute for Post-Graduate Physicians in Moscow show.

The oxygen lack acts as a stimulus to set up a conditioned reflex connection between the brain and the kidneys, a woman scientist, Dr. Tarasanko found. Such reflex connections between the brain and many other organs were described by the great Russian physiologist, the late Academician I. P. Pavlov, and the present work is said to offer further evidence to support his teachings.

The discovery of the kidney changes caused by oxygen lack was made in the course of experiments under reduced barometric pressure corresponding to altitudes of about 15,000 feet. Analysis of the kidney excretion of persons who had been at this experimentally induced high altitude for an hour unexpectedly revealed characteristic and constant changes in certain components appropriate to marked oxygen starvation.

The kidney reflex reaction to artificial high altitude gradually disappears after seven to nine tests but can be induced again by return to the experimental high altitude environment.

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GENERAL SCIENCE

Scientists Urged to More Political Activities

➤ SCIENTISTS are urged to greater political activity and to formulate their views in order that the interests of science may be more ably presented and its progress accelerated. This is the message of an editorial (*The Review of Scientific Instruments*, August) written by Dr. Gaylord P. Harnwell, physics professor at Princeton University, and editor of the journal.

Scientists, he says, are predominantly individualistic and ordinarily take little interest in politics. But endowments are shrinking and scientific research is being increasingly supported by public funds and by industry. Moreover, the government has its own research institutions which with the war emergency have enormously expanded so that scientific activities are coming more and more under government direction.

"The action of Selective Service Boards," Dr. Harnwell continues, "affects not only present scientists but future ones through a diversion of talent from scientific training . . . it is our obligation as scientists to be sure that our point of view and interests are ably presented and adequately considered."

"The number of scientists is too small," Dr. Harnwell says further, "for its vote to be of significance. However, an organized minority, particularly if it enjoys wide popular respect and is sufficiently articulate, can exert an influence well beyond that of its individual members . . . and an effort should be made to crystallize our basic tenets in order that the needs of science in our society may be more ably presented."

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GENERAL SCIENCE

Offer Soviet Cooperation To American Colleagues

➤ CONFIDENCE was expressed that "cooperation between Russian and American scientists will contribute to the extermination of the common foe of Hitlerism" in cabled greetings transmitted to Science Service by the Soviet Scientists Anti-Fascist Committee in Moscow. It was suggested that information should be exchanged between scientists of the two nations. The Soviet Committee has transmitted to Science Service reports of current Soviet researches.

Science News Letter, September 19, 1942

NUTRITION

Cheaper Vitamin B_2 Can Be Made From Yeast

➤ CHEAPER RIBOFLAVIN (vitamin B_2) for bread enrichment is the prospect held forth by Dr. Jonas Kamlet of Miles Laboratories, Inc., New York City. Ribose, a special sugar which is the only raw material from which riboflavin can be elaborated, is produced by a strain of yeast that is fed on waste sulfite liquor from paper-pulp mills, one of the most troublesome of all industrial wastes.

The process was developed first at the National Bureau of Standards, Dr. Kamlet stated, and the first commercial installations are two plants set up in Canada by a Swedish engineer, G. Heijkenskjold. Similar plants will be built in the United States after the war.

Science News Letter, September 19, 1942

IN SCIEN

CHEMISTRY

Dyes Made From Coal Instead of Coal Tar

➤ DYES MADE directly from soft coal, instead of the time-honored coal tar, were described before the meeting by Dr. H. B. Charmbury of the Pennsylvania State College. The coal is first treated with nitric acid, to obtain a foundation matrial which is then treated with organic acids and inorganic alkalis to produce the dyes themselves. These direct-from-coal dyes were tried by Dr. Charmbury on animal fibers like silk and wool, vegetable fibers like cotton and linen, and synthetics like rayon and nylon, with successful results.

Science News Letter, September 19, 1942

MATHEMATICS

Criminal Statistics Now More Speedily Digested

➤ CRIMINAL statistics can be more quickly worked up and more accurate conclusions drawn by the modern method of "judiciously" sampling the whole available material with regard to accuracy and completeness of data, instead of taking many hundreds or perhaps a thousand or more cases, as heretofore, and attempting the herculean task of working them all up.

This is the view expressed by Dr. Ruth Struik, mathematician of Radcliffe College, and Dr. Miriam van Waters, penologist and superintendent of the Massachusetts Reformatory for Women in Framingham, in a paper presented at the annual meeting of the American Mathematical Society.

The old method, they said, was long and expensive, requiring a whole staff of clerical assistants of doubtful reliability, and depended on the mathematics of large numbers to cancel out, more or less, the conflicting errors. The results did not always agree with the experience of those dealing for years with criminals, and sometimes were startlingly different.

By the new method, one expert can carry out a whole investigation and reach results quickly and accurately.

Science News Letter, September 19, 1942

E FIELDS

NUTRITION

Vitamin A Helpful in TB, Test on Animals Shows

➤ DESTRUCTIVE EFFECTS of tuberculosis germs in the lungs of diseased mice were reported to the American Chemical Society by Dr. C. P. Katsampes and Dr. A. B. McCoord of the University of Rochester School of Medicine.

They produced tuberculosis in 120 white mice by infecting them with human tubercle germs. Half of the mice received plenty of vitamin A, the remainder none. Within 28 days, about 60% of the mice died. However, the animals receiving the high vitamin A diet tended to live longer. While the lungs of normal mice contain a considerable amount of vitamin A, the lungs of the diseased mice had scarcely a trace of it.

Blood of severely ill human TB patients, the investigators found, is lower in vitamin A than that of healthy persons. They called attention to the general practice of giving tubercular patients cod liver oil and other foods rich in this vitamin.

Science News Letter, September 19, 1942

TEXTILES

Sex Equality in Clothes, Textile Expert Predicts

➤ ONE TIME-HONORED quarrel between husbands and wives will be eliminated this winter. Thinly-clad wives will no longer say, "Dear, turn up the thermostat, it's freezing in here," while their husbands growl, "Why don't you put some clothes on if you're so cold?"

For one thing, there won't be that much heat. For another, men and women will be wearing approximately the same weight of clothing—heavier for women, lighter for men, according to the prediction of M. Earl Heard, Dean of the Philadelphia Textile Institute of the Philadelphia Museum of Art.

This further step toward equality between the sexes will be made necessary by wartime fabric shortages, reports Mr. Heard (*Journal of Home Economics*, Sept.). This will necessitate the production of wools and wool blends which can be used interchangeably for both men's and women's wear.

Doctors and hygienists who have complained for years about the unhealthy dilemma of winter-clad men who must swelter in steam heat, or take the risk of their wives' catching pneumonia with the temperature below 75 degrees, should be pleased with this news. Marital harmony should be enhanced, too, when husbands cannot say, "Put on some clothes," nor wives properly retort, "Why don't you take off your coat if you're so hot?"

"Accent on the heavier slack or suitweight utility clothes" will be the fabric trend this winter, Mr. Heard believes. He quotes a market authority that 1943 staples will be gabardines, whipcord, men's suitings adapted to women's wear, flannels, coverts, tweed-type rayons.

Science News Letter, September 19, 1942

CHEMISTRY

New Process Gets Alcohol Cheaply from Wastes

➤ SMOKELESS powder and synthetic rubber can be made cheaply and abundantly, using alcohol from watery wastes now poured down the sewer. The economics of the method, which by-passes the expensive distillation process, were explained before the meeting of the American Chemical Society at Buffalo by Dr. Donald F. Othmer and Dr. R. L. Ratcliffe of the Polytechnic Institute of Brooklyn.

Waste liquors from paper mills and other industrial plants, as well as sawdust, straw, cornstalks and other agricultural wastes, contain sugars capable of being fermented into alcohol. But the solutions are so thin and watery that the fuel needed for distillation is worth more than the alcohol that could be obtained.

Key to the riddle is fusel oil, one of the most troublesome devils of the late unlamented bootleg era. Fusel oil dissolves alcohol but will not mix with water. So this toper's enemy is put to work getting the alcohol out of the watery wastes. Subsequently a chemical divorce between the alcohol and the fusel oil is arranged.

A similar use of fusel oil can be made in getting acetone and other valuable industrial solvents out of solutions until now considered too thin to be profitably worked.

Science News Letter, September 19, 1942

MEDICINE

Many Animals Can Carry "Rabbit Fever"; Ask Report

➤ RABBIT FEVER is the popular name for tularemia, but remember that it is not just rabbits that can carry the disease. Tree squirrels, opossums, skunks, coyotes, quail, ground hogs, muskrats, deer and red fox are among the animals that have given the disease to those who handled or were bitten by them. Certain ticks and deer flies can also transmit the disease.

Tularemia is increasing yearly in the United States and has now been added to the diseases on which the U. S. Public Health Service receives weekly telegraphic reports from the state health officers. It has recently become quite a problem in the northwestern part of Arkansas, where 58 cases have been reported this year so far, but the disease is by no means limited to Arkansas.

"There is no specific preventive or curative treatment for the disease," the federal health service states.

Best way to avoid the disease is to avoid handling wild rabbits with the bare hands. Be careful also about handling any of the other wild animals that may have the disease if they appear sick and are easily caught or shot. Their sickness might be tularemia.

Unlike many other germs, the germ of this disease can go through healthy skin without having to have a cut or scratch or bite to get through the skin. Those who skin, dress and cook or otherwise handle wild rabbits should therefore protect themselves by wearing rubber gloves, being sure there are no tears or pinholes in the gloves to let the germs through to the skin. Infected meat is made safe by thorough cooking but the germ will remain alive and virulent in the red juices of partly cooked game.

Liberal use of soap and water, followed by disinfection, is recommended to remove the blood or other infected material if any gets on the hands or splashes on arms or face of those handling, dressing or cooking wild rabbits. The same precaution should be observed after touching the fur of wild rabbits killed in areas where tularemia exists.

Carcasses of rabbits or other game in which peculiar whitish spots are found on both liver and spleen should be suspected of tularemia and should be discarded and buried or burned.

Science News Letter, September 19, 1942

ENGINEERING

How To Save Fuel

It will be necessary for each homeowner to conserve all the heat possible this winter. But it is possible to lick both old man winter and the Japs.

By DR. MORTON MOTT-SMITH

➤ FUEL THAT HEATS your home could drive machinery of war. An overheated house this winter may result in one less gun or tank for our fighting men.

By patriotism or government order, every citizen will have to conserve all the fuel possible. Warnings re-echo back and forth across the nation clear from the eastern Atlantic states to the Pacific Northwest — shortages may develop, whether it be from war needs or lack of transportation.

Here are tips on how the home owner can put steam behind the victory drive by making more fuel available for war production.

Most houses are proverbially too hot and too dry in winter, except in the Southwest where the winters are wet. Less heat and more moisture would indeed be more healthy and it should not be difficult for us to economize fuel and accustom ourselves to a more healthful temperature.

The most modern heating apparatus does make provision for moistening the air. Where this is not supplied, shallow pans of water may be placed on stoves or radiators. This will help some but a boiling kettle is much better. Humid air at 65 degrees is more comfortable than dry air at 70.

Europeans Used to Cold

In European countries, 60 degrees Fahrenheit is regarded as a comfortable winter temperature, as compared to the 68-72 degrees demanded here. This is partly due to the more humid climate abroad; but it is mostly due to the fact that Europeans have merely accustomed themselves to lower temperatures. Poorer classes get along with still less heat, or even with totally unheated rooms while the temperature may be freezing outside.

Government officials say that we must accustom ourselves to a maximum of 65 degrees by day and 55 degrees by night. How can we do it? Let's take a few tips from the Europeans.

There is a tradition in southern Europe that if the feet can be kept warm, the whole body will be warm. In railway carriages, often the only heat provided is by a long flattened metal cylinder filled with hot water and laid on the floor for your feet. You'd be surprised at the comfort it provides.

In a completely unheated room in southern Europe, you come upon the lady of the house seated with a charcoal brazier under her feet and holding another, made of earthenware and shaped like a basket, in her lap to keep her hands warm—and looking quite contented. Of course she will have a shawl about her shoulders, and be wearing much warmer indoor clothing than has been the custom here.

Keep Floors Warm

This principle of keeping the feet warm is at last becoming recognized in the United States. Some builders recently have embedded steam pipes or electric cables in the floors.

A warm cellar will also keep the floor above warm. Many heating engineers regard any heat dissipated in the cellar as wasted and, by heavily insulating the furnace and all hot pipes, seek to prevent it. But this heat is not wasted if it doesn't escape to the outside or become excessive.

Since hot air rises, all radiators, registers and auxiliary heaters should be kept as near the floor as possible. In addition it is helpful to provide baffles or deflectors above the registers or radiators to reflect the hot air or radiation downward. If a steam-heat radiator is against a wall, a sheet of metal between it and the wall will throw back the heat into the room.

The sheet may be backed by insulating material, for it is of no value to heat the wall, especially if it is an outer wall. The sheet should curve over the top of the radiator and slightly downward on the inside to direct the rising warm air downward.

Because of cheap and abundant fuel, our heating arrangements usually have not been made as efficient as they could be. Many homes are heat sieves, especially wooden frame houses. It is as difficult to heat a porous house as to fill a sieve with water.

We like plenty of fresh air. We want open windows, especially at night. But the European home is tightly closed. Great felt blankets even stretch across windows that are never opened. How can people live, how can they sleep, in such stuffy rooms? They do—and thrive.

Although the sweeping gusts of wind from upflung windows may be desirable, physiologists tell us that much less ventilation is adequate as far as the life-giving oxygen supply is concerned.

Forego Open Windows

Let's forego the luxury of unlimited fresh air. Windows open only a crack at night, and closed most of the rest of the time! If the house must be aired, do it between two and four in the afternoon when the day is warmest.

Obviously, all leaks should be stopped as far as possible. This means weather stripping on all doors and windows, perhaps double windows, and pads on double-hung windows over the crack between the two sashes.

Heat escaping to the attic is the most important leak. The attic should be

PREVENTING LOSS—Application of glass wool or other insulation prevents loss of what heat you have.

HEAT CONSERVATION—How to keep the youngsters warm this winter with the least amount of fuel consumed, is the concern of every family in the nation. Use of double windows is just one of many devices for conserving heat.

sealed airtight. A layer of heat insulating material spread over the ceiling on the top floor is also advisable, especially if there is no attic floor. You can buy the insulation in bags and spread it yourself.

Insulation between the outside walls is helpful but not as necessary. Only 2% to 3% of the heat escapes through plaster and wooden walls. Brick and stone houses are already well insulated.

Windows are the chief avenues of escape. Even closed, sealed windows lose much heat. Glass is a poor conductor of heat, but there is only ⅛ inch or less of it between the inside and the outside temperatures, as against 6 inches or more of walls.

Layer of Air

Double windows and storm doors are thus worth several times their weight in fuel. But doubling the thickness of the glass has little effect. It is the layer of air between double windows that provides the insulation. For windows that will be seldom opened, the storm window may be a single sash fastened to the outside window frame, so it can be taken down in summer. Some persons use an inexpensive double window of cellophane to hold an insulating cushion of air. This is applied inside.

The storm door will be more effective if there is a little vestibule so that the outer door may be opened and closed before the inner door is opened. The vestibule can be made of wood and fastened to the house. In summer it is removed.

Such devices are standard equipment in the colder parts of the country. Their use could well be extended.

Clean Up

After the house has been made as nearly heat-tight as possible, let's use the most economical and efficient methods of heat production.

Stoves, grates, burners, pipes and chimneys should be cleaned. Adjust oil burners carefully. A badly adjusted burner can waste much fuel oil or gas. Soot and ash on pipes reduces heat conduction. Worn-out and inefficient heaters should be replaced by new ones, if possible, or at least be repaired.

Unused rooms should be shut off, and the other rooms heated only while in use. As far as possible the family should use only one room in the daytime.

Thermostatic control is recommended. If that is not installed, a few inexpensive thermometers may be scattered about—then watched. When the temperature is higher than necessary, turn off the heat.

At night, fires should be banked or burners turned down as low as possible. To bank a fire, it should first have been burning brightly for some time with drafts open until all the coals are glowing. Push the live coals to one side of the furnace. Then place the fresh coal in the depression on the opposite side. Drafts and damper are closed until there is only just enough air to keep the fire going.

In the morning, the drafts and dampers are opened wide and the house is soon heated. Two feedings per day should sate the appetite of a good coal furnace. If all the family go away for the day, the fire may again be banked. Putting on ashes to bank the fire is not recommended since this is likely to generate harmful gas. Regulation should be entirely by drafts and damper.

Pile on the Coats

For the cold nights, put an extra blanket on the bed. If that isn't enough, pile on blankets, coats or whatever else may be available. Socks and flannel pajamas may not be fashionable night attire, but they're surely warm.

Increased warmth may often be obtained by putting heavy paper or other insulation beneath the bed mattress rather than war-scarce wool blankets on top. Don't think that living in a cold house will cause you to feel the cold less outdoors. Just the opposite. If you are already chilly when you start out, you will be really cold just that much sooner. So before going out, warm yourself well by getting close to the source of heat.

Electric stoves as auxiliary heaters are an expensive way of producing heat, but the fact that they can deliver a small amount just where needed often makes it possible to dispense with a much larger amount from the main source. An electric stove under the feet will work wonders. But electricity is also one of the driving forces of the war industries and must be used sparingly.

Where wood is cheap and plentiful, the open fireplace is a useful auxiliary that saves other fuel and adds cheerfulness to the home. And speaking of psychological effects, note how warm colors, bright yellows, oranges and red, add to the cheerfulness of drab winter days and give a feeling of warmth.

With spirits high and fuel saved, we're helping to lick both old man winter and the Japs.

Plastics for packaging

This unit of "THINGS of science" exemplifies the power of applied science to produce useful new materials. Its specimens of cellophane, of cellulose acetate, of ethyl cellulose sheeting, of pliofilm, are plastics recently developed in this country for the packaging industry.

Many of these plastics are now rapidly becoming "museum pieces" because of the war. The producers of THINGS of science collected specimens over a period of months, especially for the plastic unit.

An explanation of the processes of manufacturing cellophane, ethyl cellulose sheeting, and cellulose acetate sheeting, and of the process for printing cellophane; descriptions of pliofilm, of a bottle band made of Sylphseal, and of a sausage casing; and many suggested experiments complete this unit of THINGS of science.

As in all units of THINGS of science, this unit contains specimens of scientific material to be examined, studied, and enjoyed. Museum-style legend cards are supplied for each science object; a brief, clear explanation of the entire contents is included with suggested experiments. This service is under the sponsorship of Science Service, the nonprofit institution for the distribution of scientific information.

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Th-13

MEDICINE

Frame Helps Backache

Shaped to fit and support the back and covered with firm but resilient surface, it provides comfortable sleep, permits complete relaxation which banishes pain.

➤ A RELAXING FRAME that gives backache sufferers a good night's sleep and helps banish pain in daytime hours by teaching relaxation was announced by Dr. A. W. Schenker and Dr. William Bierman, of New York, at the American Congress of Physical Therapy in Pittsburgh.

Many a patient with backache from arthritis or some other cause sleeps with boards between his mattress and bed spring to gain relief from his backache, though shoulders, hips or other parts of the body may be sore from the hardness of the bed on boards.

"The boards are doing a most valuable service," the New York doctors stated, but pointed out that they meet the situation only partially.

The relaxing frame which they devised is shaped to fit and support the back along the vertebral column when the patient is lying in correct position for complete relaxation. It fits over a resilient surface, such as a coil spring bed or an inner spring mattress, and is covered with a thin, firmly yielding substance such as foam rubber to avoid pressure on hard, bony surfaces.

When the patients first see the frame with its "hills and valleys" they often ask how anyone can possibly sleep on it.

"The answer," the doctors stated, "is simply that whoever has slept on it has done so more comfortably than ever before."

Patients accustomed to lying on their sides find the hills and valleys of the frame to some extent approach the lateral curves of the body. All patients, however, are told to train themselves to sleep on their backs, which the doctors declare is the only position in which complete relaxation is possible.

The relaxing frame for sleeping is used with other methods of treatment according to the patient's need. Basis for the frame is that pain brings on a spasm of muscles in the involved area in order to hold the painful part still. With the disappearance of the pain, relaxation of the involved muscles occurs. But, conversely, any means, such as heat or drugs or correct positioning of the joints, which enables the muscles to relax will abolish or at least diminish the pain.

A patient with insomnia for 10 years as well as others with backache from various causes have been helped to sound sleep at night by the use of the frame, the doctors reported.

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PHYSICS

Rubber Behavior Studied

➤ PHYSICS SUPPLEMENTED chemistry in a search for causes of the stretchy, bouncy behavior of rubber, at the meeting when a group of physicists from Notre Dame University presented three papers before the American Chemical Society in Buffalo. The chemists remembered the classic contributions of a former colleague from the same university, the late Father Nieuwland, pioneer in the creation of synthetic rubber, as they listened to the presentations of Dr. Eugene Guth, Dr. S. L. Dart, Dr. R. L. Anthony and Dr. L. E. Peterson, together with Dr. H. M. James of Purdue University.

The picture they gave was one of a curious substance that has some of the behavior features of a solid, some of a liquid, and some even of a gas. Explanation is to be found, the speakers suggested, in the shape of the individual rubber molecules, which are long, spiral, wormlike affairs that hook their coils together like tangled springs.

One of the gas-like properties of rubber is its curious sudden rise in temperature when it is stretched, and its cooling when it contracts. This can be tested by anyone, merely by touching the lips to a quickly stretched rubber band. The Notre Dame scientists have made a quantitative study of this strange temperature effect in rubber, with sensitive scientific instruments.

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ASTRONOMY

Matter In Empty Space

Astronomical mystery is partly cleared by discovery of "impossible" substance in "empty" space. Identified as CH. One spectral line remains unexplained.

➤ A SUBSTANCE impossible on this earth, but lying in the vast stretches of so-called "empty" space between the stars, partly clears up an astronomical mystery of long standing. It accounts for three of four spectral lines that have puzzled astronomers. The fourth is still unexplained.

The substance is hydrogen carbide or carbon hydride, whichever you prefer to call it. But astronomers simply call it CH, for the molecule is composed of one atom of carbon and one of hydrogen.

The final step in the proof was accomplished by two Canadian physicists who looked not at the sky but through the eyepiece of a spectrometer in the laboratory. The physicists are Dr. A. E. Douglas of the National Research Laboratories in Ottawa and Prof. G. Herzberg, physicist at the University of Saskatchewan.

The spectrometer is the instrument that spreads light out in a rainbow and tells what things are made of here and in the skies, provided the spectrum "lines" are identified with similar lines given by a known substance. Each line corresponds to a particular wavelength of light. A good instrument will measure this to a 25-billionth of an inch.

Astronomers examining the stars with this instrument have noted four sharp lines which did not correspond to those of any known substance. On theoretical grounds and as a result of mathematical calculations they attributed them to CH, existing in the space between the stars.

Much of this work was done by Dr. Theodore Dunham, Jr. and Dr. Walter S. Adams of the Mount Wilson Observatory in California, and Dr. Andrew McKellar of the Dominion Astrophysical Observatory, B. C.

But the astronomers could not be sure of their conclusion, because since CH does not exist on the earth, its "lines" had never been seen.

All this has now been remedied, for Dr. Douglas and Dr. Herzberg have produced three of the lines in the laboratory and positively identified them as belonging to CH. The fourth line which did not appear, they gave good reasons for believing does not belong to CH. Hence, the fourth line still remains a mystery.

The reason why CH (and also CH_2 and CH_3) are "impossible" compounds on this earth is that the normal quota of the carbon atom is four atoms of hydrogen. If it has a less number, it is unsatisfied or "unsaturated," and immediately sets out to fill its quota. It may accept other atoms than hydrogen or it may join with other unsaturated hydrocarbons to form the large groups or the long chains that compose the molecules of petroleum, rubber and other organic compounds.

The carbon atom has no difficulty here in filling its quota, with plenty of materials close at hand, 500 billion billion molecules to a cubic inch of air. But out there in "empty space" it is believed that there is about one atom or molecule to a cubic yard. If the carbon atom were magnified to the size of a pea, and the cubic yard were similarly magnified, there would not be another atom of any sort within a million miles. The carbon atom would be lucky to get even one hydrogen atom to share its loneliness, and however much it might yearn for more, it would be a long time before it got any. CH can therefore very well exist for prolonged periods in "empty" space.

The manner in which the Canadian scientists produced CH lines in the laboratory was by admitting a small amount of benzene to an atmosphere of inert helium gas and passing an electric discharge. Apparently the discharge broke up the hydrocarbon molecules of the benzene and CH existed momentarily while the carbon atoms were filling their quotas.

How short this time is may be gathered from the fact that CH_3, which would be the most stable of the three compounds, had previously been produced in the laboratory, but half of it disappears in 1/1,000 to 1/10,000 second.

The lines obtained by the Canadian scientists were very faint. Exposures of one to ten hours were required to photograph them.

Twice before have mysterious spectral lines puzzled astronomers. They were then attributed to new elements not yet discovered on the earth, but in both cases they turned out to be very common earthly substances, but in a peculiar state. There were the mysterious green lines seen in the spectra of nebulae, which were attributed to an unknown element, which was called "nebulium." But in 1927, Dr. I. S. Bowen of the California Institute of Technology showed that it was simply oxygen and nitrogen emitting "forbidden" lines, possible only when the gases are extremely attenuated.

Again, a conspicuous green line and others in the spectrum of the sun's corona were attributed to an unearthly element and named "coronium." But in 1941, the Swedish astronomer, Dr. Bengt Edlen, showed that these lines were probably due to atoms of iron and calcium stripped of most of their electrons by some powerful agency that had not been duplicated on the earth. Finally, 1942, the Indian scientist M. N. Saha proposed that the highly damaged atoms were produced by "fission", the famous process by which physicists are seeking atomic power.

In any case scientists believe that all possible elements have now been discovered. No new ones will be found in the sky.

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MEDICINE

War Medicine Practiced In Sandbagged Hospital

See Front Cover

➤ SOMEWHERE in Hawaii stands the unit of a mobile base hospital established by the Navy's Bureau of Medicine and Surgery, shown on the front cover of this week's SCIENCE NEWS LETTER. It is fully staffed by doctors, nurses and Medical Corps men and equipped with modern operating room. The mobile base hospital is located as near the fighting front as is possible, or if necessary, in dangerous bombing zones.

The sandbag "thatching" is mute evidence of the new methods of warfare used by our enemies. Evidently, hospitals can no longer be conspicuously undefended and marked with the huge red cross that used to provide immunity in former wars.

The cover picture is an official U. S. Navy photograph.

Science News Letter, September 19, 1942

ANTHROPOLOGY

Gives Throne for Science

Nigerian delegate to International Student Assembly believes he can serve his people best by study of anthropology in the United States.

➤ THE NIGERIAN delegation at the recent International Student Assembly in Washington was one of the most active in trying to promote international cooperation, along the lines of freedom and democracy for all.

At least two of the Nigerian delegates are royalty—Crown Prince Orizu, who is now studying political science at Ohio State University, and Dr. Julius Okala, who turned down the offer of a throne in order to become a doctor in anthropology at Northwestern University.

Dr. Okala thought he could best serve his people, not by ruling them, but by bringing back American ideas in public health, education, and production of raw materials. He says his people have a greater respect for American methods and education than those of Europe. Nigeria is a British protectorate in West Africa.

After another year or so of study, Dr. Okala plans to return home with his American bride who is now practising in Harlem as a public nurse. This young couple have great hopes of improving conditions in Nigeria.

On public health, Dr. Okala said, the Nigerian government is now spending about 25c a year per capita, for a population of 33,000,000. This, combined with the shortage of doctors, keeps the people dependent on native "witch doctors." Another difficulty, he said, is that British doctors are paid twice as much as native doctors, even though they have had the same training in Edinburgh medical schools. Nigeria now has its own medical school, with 102 "excellently trained" graduates so far, and Dr. Okala hopes that these physicians will some day be given more responsible posts than they have so far held.

He and his friend, Crown Prince Orizu, are actively campaigning for free cooperation of all United Nations, as equals. The fight for freedom against the Axis, they explain, means fighting to be free—not fighting for somebody else's freedom.

To them the most dangerous issue of the war is the continued use of the terms "backward" and "primitive," which even their allies still use in describing certain races or countries. The African, Indian and Chinese delegates feel strongly that these words should be reserved for the backward people or areas to be found in every country.

Science News Letter, September 19, 1942

Fish meal is one of the supplemental foods used for fattening pigs.

● RADIO

Saturday, September 26, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. P. G. Agnew, Secretary, American Standards Association, will talk about Standards in the War.

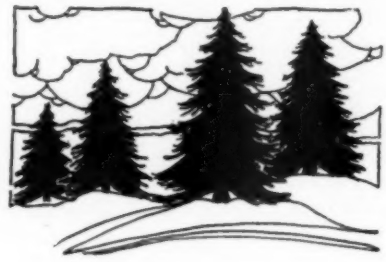
Tuesday, September 22, 7:30 p.m., EWT

Science Clubs of America programs over WRUL, Boston, on 6.04, 9.70 and 11.73 megacycles.

One in a series of regular periods over this short wave station to serve science clubs, particularly in the high schools, throughout the Americas. Have your science group listen in at this time.

METEOROLOGY

NATURE RAMBLINGS
by Frank Thone



War Weather

➤ GOING the rounds again is the venerable superstition that this summer's abnormal weather, which has been unusually wet over most of the country, is somehow traceable to the war.

Some of the pseudo-scientific speculations blame the explosions in the maneuver areas where troops engage in mock battle and target practice, as well as the heavier detonations of bombing practice with live ammunition. Others seek a similar explanation on a remote-control basis, placing the responsibility for a disturbed world-weather picture on the wholesale firing on the Russian, Chinese and other battle-fronts.

We had the same cycle of speculations in 1918. It doesn't seem to make any difference to the self-constituted weather experts that the abnormal weather that summer was drought instead of too much rain.

Actually, of course, the heaviest bombardments that war-waging man has ever staged have no effect on the course of the weather.

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Furthermore, there is no reason for supposing that explosions will either precipitate or prevent rain, even on a small, local scale. Rain-makers, who impose on the gullibility of drought-stricken communities, have used explosives, both on the ground and sent into the air by balloons, kites and other means—of course without results.

Underlying these speculations probably is an unrecognized survival of the primitive superstition known as sympathetic magic—the idea that you can influence the course of natural events by making imitative sounds and gestures. The noise and flashes and smoke of explosions resemble thunder, lightning and clouds; therefore they can compel them to come.

Science News Letter, September 19, 1942

NUTRITION

Meat Ration Is Adequate

Proposed allotment of two and one-half pounds for each person each week is larger by two-thirds than ration "adequate for indefinite period" set by scientists.

➤ THE PROPOSED meat ration of two and one-half pounds per person each week provides more than adequate nourishment. It is larger by two-thirds than the one and one-half pound per person per week ration labeled "adequate" for an indefinite period by scientists of the U. S. Bureau of Home Economics.

That much smaller but nutritionally adequate ration called for "meat or fish three to four times a week," instead of the present five times. For a restricted period of time, a moderately active grown person could even get along on two servings of meat, totalling three-quarters of a pound, per week, the government scientists stated. Their recommendations were made back in the depression days when meat was plentiful but family food budgets were short. Conditions are reversed today but the scientific facts of nutrition and our need for meat and other protein foods are unchanged.

Meat, that is, beef, pork, veal and lamb, constitute one source of protein needed for building muscles, heart and other internal organs, skin, hair, nails and other body tissues. Many other protein sources exist.

On the days when you cannot have beefsteak for dinner, you can have chicken or other poultry, or fish, or eggs, or cheese or extra milk. All these foods furnish protein of the same kind that red meat furnishes. Two cups of whole milk furnish more than half the daily protein ration needed by anyone except nursing mothers and boys and girls in their teens.

Beans, peas, lentils and nuts furnish protein also, but the kind of protein in these foods is not a complete substitute for the kind in meat, fish, eggs, cheese or other animal foods. Soybeans are a notable exception to this. When the soybean is heated, its protein becomes almost as efficient as that in meat and much better than any other plant protein for the growth and repair of body tissue.

Science News Letter, September 19, 1942

EDUCATION

Marconi Prizes Awarded

➤ IN A NATION-WIDE competitive examination administered in high schools throughout the country for the Marconi Memorial Award Scholarships, Edward Lombard, 17 years old, of Syracuse, New York, a graduate of Central High School, won first place and thereby a two-year full-tuition scholarship in radio and electrical communication at the R.C.A. Institutes, Inc., in New York.

John Raymond Miller, 18 years old, of Orange, California, a graduating student of Orange Union High School, was awarded the second prize, a one year complete course in aviation radio at Midland Radio and Television School, Kansas City, Missouri.

These scholarships are annually awarded by the Veteran Wireless Operators Association as a living memorial to Guglielmo Marconi whose pioneering in wireless made possible modern radio.

The scholarship competition is open only to graduating high school seniors who are members of Science Clubs of America and/or members of the American Institute Science and Engineering Clubs. The other requirements are that the contestant must have completed at least one year of geometry, one year of physics, and one and one-half years of algebra and must evidence an interest in radio as his life's work.

The examinations were administered by the sponsors of each high school's science club. Accompanying each examination was an essay on the topic, "Why I Want to Become a Radio Engineer," written by the student. Judgment was based upon the score made in the examination, upon school records, and upon an evaluation of the essays.

The judges of the competition were: J. R. Poppele, Chairman of the Scholarship Committee, representing the Veteran Wireless Operators Association, Dr. Herbert H. Zim, representing the American Institute of the City of New York, and Joseph H. Kraus, representing Science Clubs of America. Concurring in the decision was William J. McGonigle who has been president for the past six years of the V.W.O.A.

Science News Letter, September 19, 1942

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· New Machines and Gadgets ·

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 122.*

❁ *DEFINITE SMALL VOLUMES of liquids, for clinics and laboratories, can be dispensed quickly and accurately with an automatic pipette recently introduced. The instrument can be set to deliver any volume of 1/10 to 5 cubic centimeters, and once set delivers always the same volume with each stroke of the piston, thus saving time and mistakes in such work.*

Science News Letter, September 19, 1942

❁ *A POCKET UMBRELLA which not only has a telescoping handle—in five parts—but ribs that fold zigzag in three parts is described in a recent patent. When closed, staff, ribs, cloth and all slip into the cylindrical handle which is finally closed by a cap on top of the umbrella. No water from this umbrella drips on your neighbor's toes when it is closed.*

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❁ *THE OLD APPLE TREE "ain't what she used to be." Instead of men on ladders picking the fruit, a device, which has recently been patented, neatly cuts the stem just behind the fruit and conveys the latter down the pipe to the crate in which it is to be packed. The pipe contains flexible baffles which permit the fruit to descend gently and also wipe it in case it should be wet. The inventor provides different sorts of picking heads for different shapes and sizes of fruits.*

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❁ *GLASS SPRINGS, although not as strong as steel springs, have certain advantages. The most remarkable of these is the apparent absence of "fatigue," which causes a metal spring to break after a great many bendings at much below its usual breaking strength. Its resistance to chemical action is another advantage. A glass spring, used in an atmosphere laden with sulfuric acid mist, underwent 8,000,000 deflections without any sign of giving out. It may seem strange that material as stiff as glass can be used as a spring, but in thin strips it is quite springy.*

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❁ *A NEW BLACKOUT street light is what the girl in the picture is looking at—in case you hadn't noticed it. This lamp, approved by the War Department, gives an illumination equal to 1/60 that of the full moon, sufficient to distinguish a pedestrian 40 feet ahead. The lamp is made mostly of cast iron, to shed shrapnel, and plastics. The light is furnished by a 9-watt bulb. In England, the maximum outside illumination allowed without special permit is "starlight," the intensity of which is 0.0002 foot-candles and about half as bright as the illumination of this lamp.*

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• Glances at New Books •

➤ A GEOGRAPHY book in the conventional flat shape, NEW WORLD HORIZONS, edited by Chester H. Lawrence (*Duell, Sloan and Pearce*, $2.75); that is all that is conventional about it, or flat, either. It looks at geography from the airplane point of view, rather than from that of the railroad train and steamship. A student (whether child or grownup) who even skims through this book comes out with an insight into geography as a decidedly kinetic science.

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Books Just Off the Press

ASTRONOMY, MAPS AND WEATHER—C. C. Wylie—*Harper*, 449 p., illus., $3.

ATTACK, A STUDY OF BLITZKRIEG TACTICS—F. O. Miksche—*Random House*, 267 p., $2.50.

CIVILIAN HEALTH IN WARTIME—Francis R. Dieuaide—*Harvard Univ. Press*, 328 p., $2.50.

THE CLARKS: AN AMERICAN PHENOMENON—William D. Mangam—*Silver Bow Press*, 257 p., illus., $2.50.

COMPENDIUM AND DESCRIPTION OF THE WEST INDIES — Antonio Vazquez de Espinosa, Charles Upson Clark (translator)—*Smithsonian Institution*, 862 p., $2.50.

FOSSIL VERTEBRATES FROM THE SUPERJACENT DEPOSITS NEAR KNIGHTS FERRY, CALIFORNIA—R. A. Stirton and H. F. Goeriz— *Univ. of Calif. Press*, 25 p., 35c.

A LABORATORY MANUAL OF EXPERIMENTS IN PHYSICS (Fifth ed.)—Leonard Rose Ingersoll and Miles Jay Martin—*McGraw-Hill*, 342 p., tables, dia., $2.50.

THE MORSE CODE: LEARNING AND PRACTICE—R. G. Shackel—*Longmans*, 64 p., 40c.

NATURAL AND SYNTHETIC HIGH POLYMERS (Vol. IV)—Kurt H. Meyer—*Interscience Publishers, Inc.*, 690 p., illus., $11.

THE NUTRITION HANDBOOK — Demetria Taylor—*Doubleday*, 231 p., $2.

OCEANOGRAPHIC OBSERVATIONS ON THE "E. W. SCRIPPS" CRUISES OF 1938 (Vol. 1, No. 1)—H. U. Sverdrup—*Univ. of Calif. Press*, 63 p., dia., 75c.

PLIOCENE VERTEBRATES FROM BIG SPRING CANYON SOUTH DAKOTA—Joseph Tracy Gregory—*Univ. of Calif. Press*, 138 p., illus., $2.

PSYCHOLOGY IN NURSING PRACTICE—Philip Lawrence Harriman, Lela L. Greenwood and Charles E. Skinner — *Macmillan*, 483 p., illus., $3.25.

THE PSYCHOLOGY OF HUMAN LEARNING—John A. McGeoch—*Longmans*, 633 p., $4.

REVIEW OF RECENT LITERATURE ON VANADIUM RECOVERY WITH SPECIAL REFERENCE TO VANADIUM IRON ORE—F. E. Lathe—*Nat'l. Research Council of Canada*, 32 p., 25c.

SEVENTY-NINTH ANNUAL REPORT OF THE COMPTROLLER OF THE CURRENCY—*Gov't. Print. Office*, 427 p., $1.

A SHORT HISTORY OF CARDIOLOGY—James B. Herrick—*Thomas*, 258 p., illus., $3.50.

THE STRUCTURE OF NETHERLANDS INDIAN ECONOMY—J. H. Boeke—*Institute of Pacific Relations*, 201 p., $2.50.

TEXTILE FIBER ATLAS—Werner Von Bergen and Walter Krauss—*American Wool Handbook Co.*, 63 p., illus., $3.

A THEORY OF MEANING ANALYZED (General Semantics Monograph, III)—Thomas Clark Pollock, John Gordon Spaulding and Allen Walker Read—*Institute of General Semantics*, Chicago, 46 p., $1.50.

UROLOGY IN WAR—Charles Y. Bidgood—*Williams and Wilkins Co.*, 78 p., illus., $2.

THE VERTEBRATE EYE AND ITS ADAPTIVE RADIATION—Gordon Lynn Walls—*Cranbrook Institute of Science*, 785 p., illus., $6.50.